

Claims

1. An apparatus for measuring the dimensions of human feet comprising:

- (a) a base, which comprises and supports on its surfaces and within its interior electrical and optical components of said apparatus;
- (b) a cover, which fits over said base to protect said components;
- (c) optical means, which are used to make the measurements of said feet;
- (d) motion causing means, which are used to move said optical means;
- (e) control means, which automatically control the activity of said motion means in order to carry out said measurements;
- (f) counting means, which measure the motion of said motion causing means;
- (g) memory means, which store the results of said counting and, optionally, other information required for the determination of said dimensions;
- (h) computational means, which calculate said dimensions from said results and said information; and
- (i) display means, which display said dimensions and other pre-determined information;

wherein, said cover means comprises internal walls and a bridge which, together with a depression in the upper surface of said base, define the borders of two essentially rectangular wells into which said feet to be measured are inserted in order to carry out said measurements; and

wherein, said optical means comprise two light source/detector pairs;

wherein the elements of the first of said pairs are moved by said motion causing means, in a manner synchronized in both time and position, along parallel axes located respectively on two opposing sides of said wells; and

wherein the elements of the second of said pairs are moved by said motion causing means, in a manner synchronized in both time and position, along parallel axes located respectively on the other two opposing sides of said wells.

2. An apparatus according to claim 1, wherein the light sources are infrared emitting light emitting diodes.
3. An apparatus according to claim 1, wherein the detectors are infrared sensitive phototransistors.
4. An apparatus according to claim 1, wherein the motion causing means comprise two motors each of which drives two belts.
5. An apparatus according to claim 4, wherein the motors are stepping motors.
6. An apparatus according to claim 1, wherein the counting means count the steps of the stepping motors.
7. An apparatus according to claim 4, wherein the belts are timing belts.

8. An apparatus according to claim 1, wherein the control means, counting means, memory means, computation means, and the display means are an integral part of said apparatus.
9. An apparatus according to claim 1, wherein at least a part of the control means, counting means, memory means, computation means, and the display means are provided by a separate computation unit that is not an integral part of said apparatus.
10. An apparatus according to claim 9, wherein the separate computation unit is a personal computer.
11. An apparatus according to claim 1, further comprising a pad comprised of a matrix of pressure sensors that covers the floor of the wells.
12. A method for using the apparatus of claim 1 to automatically measure the maximum length and width of the feet of a human comprising the following steps:
 - (i) providing an apparatus as defined in claim 1;
 - (ii) placing the feet in the wells with the back of the heel of each foot pressed against the inner wall section of each of said wells and the interior side of each foot pressed against the side of the bridge;
 - (iii) pressing the start switch initiating the measurement process;
 - (iv) activating the light source for making the length measurement;

- (v) activating the motor to move the light source/detector pair for making the length measurement;
- (vi) counting and storing the number of steps of said motor from the “home” position until the signal from said detector disappears as a result of the feet blocking the optical path;
- (vii) computing the maximum length of the feet from said counts;
- (viii) turning off the light source for making the length measurement;
- (ix) activating the light source for making the width measurements;
- (x) activating the motor to move the light source/detector pair for making the width measurements;
- (xi) counting and storing the number of steps of said motor between the first disappearance and first reappearance and between the second disappearance and second reappearance of the signal from said detector resulting from the feet blocking the optical path;
- (xii) computing the width of each foot from said counts;
- (xiii) turning off the light source for making the width measurement;
- (xiv) causing said motors to be activated moving the attached optical elements until a limit switch is contacted stopping the motion at the “home” position;
- (xv) sending length and width measurements to the computational means;
and
- (xvi) displaying the results of the measurements.

13. A method according to claim 12, wherein step (vii) and step (xii) are carried out after step (xv).
14. A method according to claim 12, wherein steps (iv) to (viii) are carried out simultaneously with steps (ix) to (xiii).
15. A method according to claim 12, wherein steps (ix) to (xiii) are carried out before steps (iv) to (viii).
16. A method according to any of claims 12 to 15, wherein the start switch is located on the computation unit and all steps of said method after step (iii) are carried out automatically under control of said computation unit.